

## Dual-Band EUV Multilayer Coatings for Solar Physics, Phase I

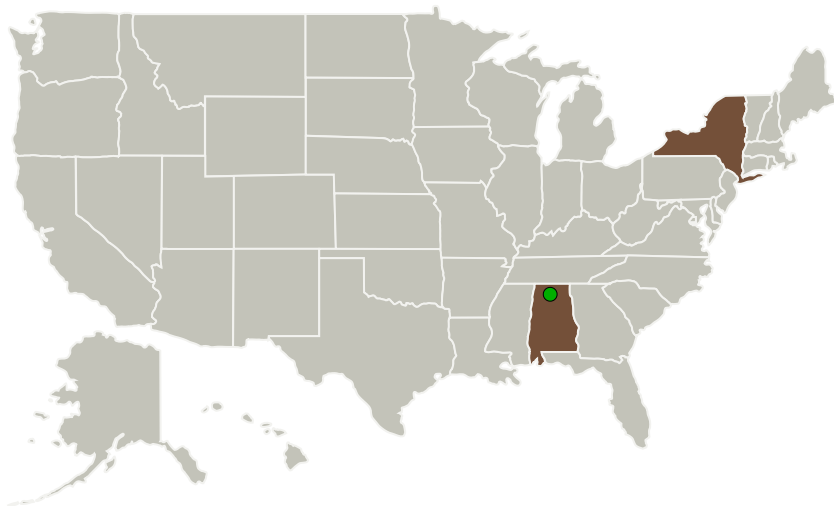
Completed Technology Project (2012 - 2012)



## Project Introduction

We propose to develop and commercialize a new class of multilayer interference coating that is designed to provide high reflection efficiency in two disparate wavelength bands in the extreme ultraviolet (EUV), a so-called 'dual-band' EUV multilayer. A high-performance dual-band multilayer coating will allow for solar imaging or spectroscopy instruments that operate in two different EUV channels using a single instrument aperture. The realization of dual-band multilayer coatings having high reflectance at the target wavelengths, low reflectance of unwanted wavelengths, low film stress, and good thermal and temporal stability, will enable the construction of future solar instruments that have much higher collection efficiency, lower mass and volume, and lower costs than is currently possible using existing multilayer coating technology. The goal of our proposed Phase I program is to experimentally investigate the performance of a new type of dual-band coating design comprising two periodic multilayers separated by a low-absorption spacer layer. This approach results in the ability to independently tune the spectral response of both EUV wavebands, and to suppress unwanted wavelengths. We will explore both B4C/Si-Si-B4C/Mo-Si and SiC/Al-Al-Zr/Al designs. We also will investigate the use of novel capping layer structures comprising Ir, Ru or other metals, for enhanced reflectance and better coating resilience in harsh environments.

## Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Reflective X-Ray Optics LLC	Lead Organization	Industry	New York, New York
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	New York

## Project Transitions

▶ **February 2012:** Project Start

✓ **August 2012:** Closed out

## Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138107>)

## Organizational Responsibility

## Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

## Lead Organization:

Reflective X-Ray Optics LLC

## Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

## Program Director:

Jason L Kessler

## Program Manager:

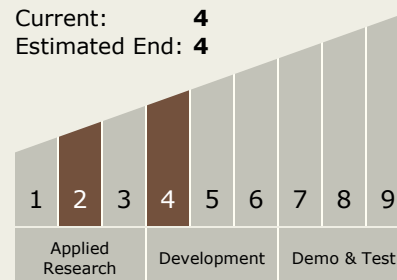
Carlos Torrez

## Principal Investigator:

David L Windt

## Technology Maturity (TRL)

Start: 2  
Current: 4  
Estimated End: 4



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## Technology Areas

### Primary:

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.3 Optical Components

## Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System